

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>Case 704 PCT</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/SE 99/01561</b>	International filing date ( <i>day/month/year</i> ) <b>8 Sept 1999</b>	(Earliest) Priority Date ( <i>day/month/year</i> ) <b>11 Sept 1998</b>
Applicant <b>Telia AB (publ)et al</b>		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (See Box I).
2. ☐ Unity of invention is lacking (See Box II).
3. ☐ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing
- ☐ filed with the international application.
  - ☐ furnished by the applicant separately from the international application,
    - ☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.
  - ☐ transcribed by this Authority.
4. With regard to the title, ☐ the text is approved as submitted by the applicant.  
☒ the text has been established by this Authority to read as follows:

**A transmission system, a method and an apparatus providing access for IP data packets to a firewall protected network.**

5. With regard to the abstract,
- ☒ the text is approved as submitted by the applicant.
  - ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. The figure of the drawings to be published with the abstract is:
- Figure No. 1 ☒ as suggested by the applicant. ☐ None of the figures.
- ☐ because the applicant failed to suggest a figure.
  - ☐ because this figure better characterizes the invention.

# 1 INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01561

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04L 29/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	EP 0909075 A1 (LUCENT TECHNOLOGIES INC.), 14 April 1999 (14.04.99), page 3, line 10 - page 4, line 14; page 6, line 20 - page 7, line 28, claims 1-13, abstract --	1-4,7-14, 18-20,27,28
X	EP 0743777 A2 (SUN MICROSYSTEMS, INC), 20 November 1996 (20.11.96), abstract, column 3, line 33 column 4, line 9, column 6, line 46 - column 13, line 6, column 9, line 23 - line 31, column 10, line 50 - column 11, line 43 --	1-4,7-14, 18-20,27,28
X	WO 9831124 A1 (HANSON, GORDON ET AL), 16 July 1998 (16.07.98), page 3, line 8 - page 6, line 32, figure 2, claims 1-20, abstract --	1-4,7-14, 18-20,27,28

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

14 March 2000

Date of mailing of the international search report

17-03-2000

Name and mailing address of the ISA

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01561

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5828833 A (BELVILLE ET AL), 27 October 1998 (27.10.98), column 1, line 53 - column 2, line 33; column 5, line 64 - column 7, line 10, claims 1-28, abstract  --	1-28
A	US 5826029 A (GORE, JR. ET AL), 20 October 1998 (20.10.98), column 1, line 47 - column 2, line 26, claims 1-12, abstract  --	1-28
A	WO 9700471 A2 (CHECK POINT SOFTWARE TECHNOLOGIES LTD), 3 January 1997 (03.01.97), page 4, line 1 - page 7, line 20, claims 1-26, abstract  --	1-28
A	EP 0713311 A1 (MILKYWAY NETWORKS CORPORATION), 22 May 1996 (22.05.96), page 3, line 48 - page 5, line 31, claims 1-28, abstract  -- -----	1-28

# INTERNATIONAL SEARCH REPORT

Information on patent family members

02/12/99

International application No.

PCT/SE 99/01561

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0909075 A1	14/04/99	JP 11168510 A	22/06/99
EP 0743777 A2	20/11/96	JP 9224053 A	26/08/97
		US 5802320 A	01/09/98
		US 5878231 A	02/03/99
		US 5884025 A	16/03/99
WO 9831124 A1	16/07/98	NONE	
US 5828833 A	27/10/98	AU 3984297 A	06/03/98
		WO 9807088 A	19/02/98
US 5826029 A	20/10/98	CA 2233441 A	09/05/97
		CN 1201573 A	09/12/98
		CZ 9801141 A	14/10/98
		EP 0872097 A	21/10/98
		HU 9802414 A	01/02/99
		JP 10512696 T	02/12/98
		PL 327446 A	07/12/98
		WO 9716911 A	09/05/97
WO 9700471 A2	03/01/97	AU 6135696 A	15/01/97
		CA 2197548 A	03/01/97
		EP 0807347 A	19/11/97
		JP 10504168 T	14/04/98
		NO 970611 A	15/04/97
		US 5835726 A	10/11/98
		CA 2138058 A	16/06/95
		EP 0658837 A	21/06/95
		JP 8044642 A	16/02/96
		US 5606668 A	25/02/97
EP 0713311 A1	22/05/96	CA 2136150 A	19/05/96
		US 5623601 A	22/04/97

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 12 JAN 2001

PCT

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Applicant's or agent's file reference Case 704 PCT	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/SE99/01561	International filing date (day month year) 08.09.1999	Priority date (day month year) 11.09.1998
International Patent Classification (IPC) or national classification and IPC H04L 29/06		
Applicant Telia AB (publ) et al.		

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 6 sheets, including this cover sheet.  
☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  
These annexes consist of a total of 5 sheets.

- This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 07.04.2000	Date of completion of this report 04.01.2001
Name and mailing address of the IPE/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Authorized officer Roger Bou Faisal/LR Telephone No. 08-782 25 00

**I. Basis of the report****1. With regard to the elements of the international application:\***

- ☐ the international application as originally filed
- ☒ the description:  
pages 1-12, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☒ the claims:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, as amended (together with any statement) under article 19  
pages \_\_\_\_\_, filed with the demand  
pages 1-5, filed with the letter of 04.10.2000
- ☒ the drawings:  
pages 1/1, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the sequence listing part of the description:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_

**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

**4. ☐ The amendments have resulted in the cancellation of:**

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheet/fig \_\_\_\_\_

**5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims	<u>1-20</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-20</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-20</u>	YES
	Claims		NO

**2. Citations and explanations (Rule 70.7)**

It is an object of the claimed invention to provide a transmission system adapted for the transmission of IP (Internet Protocol) data packets through a firewall.

According to the invention the system includes means for temporarily opening the firewall to enable IP data packets to be transmitted through the firewall to the protected network. The firewall operates in a manner whereby a particular type of IP-packet, i.e. a Ping (ICMP)-packet, is allowed to pass through the firewall, IP-traffic can pass through the firewall from the inside thereof to the outside thereof, and IP-traffic, similar to that which is sent from the inside of the firewall to the outside to the firewall, can be transmitted through the firewall to the protected network for a limited period of time. IN particular, the firewall opening means include two IC-breakers, which are located on opposite sides of said firewall, and which have a structure and functionality dictated by the manner in which the firewall operates.

Documents cited in the international search report:

[D1] EP 0743777, A2  
[D2] WO 9831124, A1  
[D3] US 5828833, A  
[D4] US 5826029, A  
[D5] WO 9700471, A2  
[D6] EP 0713311, A1

.../...

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: V

D1 discloses a method for screening data packets arriving at a screening system connected between two networks involves receiving a first packet from the first network as a current packet, and determining from the packet contents whether it is of a type to be passed to the second network. If it is suited for transfer to the second network, then a positive destination address is determined within the second network as specified by the current packet. The latter is then passed to an ersatz address which resides in a proxy system and which substitutes for the destination address. It is determined whether at least one action requested by the current packet is of an allowed type, and if not then rejects the packet. If the packet is acceptable then it is processed in accordance with its contents at the proxy or screening system. If the packet is rejected, then the system checks for the arrival of a new packet, which becomes the current packet (see abstract; column 3, line 33-column 4, line 9; column 6, line 46-column 13, line 6, especially, column 9, line 23-line31 and column 10, line 50-column 11, line43).

D2 discloses a method and system for securely accessing servers over an internet-work. Each server includes a processor and a memory. A first server outside a company's firewall connects the company to the internet-work. A user or client sends a data packet with a server name to a second server identified by the server name and located within the company's firewall. The location address of the first server is retrieved according to the domain/server name, a connection is made with the first server according to the retrieved location address of the first server and the data packet with domain/server name in the sent data packet to a list of at least one internal address, wherein the at least one internal address of the list identifies the location of the second server. If an internal address is found to match the server name, the first server sends the packet to the internal address (see abstract; page 3, line 8-page 6, line 32; figure 2 and claims 1-20).

D3 relates to an invention which comprises a method and system for allowing remote procedure calls through a network firewall. In accordance with an embodiment of the method of the invention, a request is received from an application server to allow remote procedure calls to pass through a firewall. The request is processed to determine whether the application server is authorised to receive remote procedure calls that have passed through the firewall. If the applica-

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**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Suppl.1

tion server was authorised, then an identification of the application server is placed in a filter table associated with the firewall and remote procedure calls are allowed to pass through the firewall to the application server if the identification of that application server appears in the filter table (see abstract; column 1, line 53-column 2, line 33; column 5, line 64-column 7, line 10 and claims 1-28).

D4 relates a method of directing an internal computer system that involves authenticating a connection initiated by the internal computer system to an external computer system (see abstract; column 1, line 47-column 2, line 26 and claims 1-12).

D5 discloses a novel system for controlling the inbound and outbound data packet flow in a computer network (see abstract; page 4, line 1-page 7, line 20 and claims 1-26).

D6 relates to an apparatus and method for providing a secure firewall between a private network and a public network (see abstract; page 3, line 48-page 5, line 31 and claims 1-28).

Documents D3-D6 are state of the art documents that are used to give a better perspective for understanding the claimed invention.

The invention according to Independent Claims 1, 8 and 13 differs from D1 or D2 by that it is not mentioned either in D1 or in D2 that the system includes means for temporarily opening the firewall, and by the location of the first and second IC-breaker.

It is mentioned in D1 that the packets will normally be logged in the log file storage, including whatever information the system administrator decides is important. Such information as: time of day; source and destination address; requested operations; other actions taken with respect to each packet; number of requests to date from this source and so on. Also, state information about the packets can also be determined, logged if desired, and altered by actions. These actions can be compared to the temporarily opening of the firewall for certain kind of packets.

.../...

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Suppl.2

Opening the firewall for a limited period of time can be compared to the timer functions in both D2 and D3. Passing IP-traffic in both directions are mentioned in both D1 and D2. Opening the firewall to give connection to, for example the Internet, is mentioned in D2, The IP-packet being a Ping-packet is mentioned in D2 and is considered obvious. Having IC-breakers are also considered as an obvious step. However, it is not considered obvious to include all the steps at the same time and to locate the IC-breakers as mentioned in claims 1, 8 and 13.

The invention according to Claims 1-20 is novel, is considered to include an inventive step and to have industrial applicability.

04-10-2000

**CLAIMS**

1. A transmission system, adapted for the transmission of IP data packets, said system including an IP-network (IP-NET) and a network (LAN) protected by a firewall, said firewall being adapted to block incoming traffic to the protected network, and devices (IC-BREAKER 1 and IC-BREAKER 2) to open the firewall to enable IP data packets to be transferred through the firewall to the protected network, **characterised in**, that said devices to open the firewall include a first IC-breaker (IC-BREAKER 1) located on the IP-network side of the firewall and a second IC-breaker (IC-BREAKER 2) located on the protected network side of the firewall, that said firewall is transparent to a particular type of IP packets to enable communication between said IC-breakers through the firewall using said particular IP packets, and that said first IC-breaker is adapted to from the IP network equipment receive IP data packets, intended for the protected network (LAN), and that said first IC-breaker is adapted to, on receipt of such a particular IP data packet for the protected network, send said particular IP packet to said second IC-breaker, and besides an IP packet of said particular type, returned by said second IC-breaker to said first IC-breaker, occasionally opens the firewall, at which said first IC-breaker is adapted to, on receipt of a returned IP packet of said particular type, send said received IP data packet through the open firewall to the second IC-breaker, and that said second IC-breaker is adapted, on receipt of said IP data packet, to send the received IP data packet to the protected network.
2. A transmission system, as claimed in claim 1, **characterised in** that said particular type of IP-packet is a Ping (ICMP)-packet.
3. A transmission system, as claimed in claim 1 or claim 2, **characterised in** that said firewall is adapted to be transparent to IP-communication through the firewall from the inside to the outside thereof, and, for a limited period of time, open to IP-communication through the firewall from the outside to the inside thereof.
4. A transmission system, as claimed in any preceding claim, **characterised**

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in that said first IC-breaker (IC-BREAKER 1) is adapted, on receipt of an IP data packet, to store said IP data packet and send said stored IP data packet through the open firewall to the second IC-breaker (IC-BREAKER 2), when the firewall has been the opened.

5. A transmission system, as claimed in any preceding claim, **characterised** in that said second IC-breaker (IC-BREAKER 2) is adapted to identify the size of a Ping IP-packet received from a sender in the form of a IC-breaker said size being indicative of the type of packet, which has been received and the port via which it was received.

6. A transmission system, as claimed in any preceding claim, **characterised** in that said protected network is a Local Area Network (LAN).

7. A transmission system, as claimed in any preceding claim, **characterised** in that said system is an Asynchronous Transfer Mode (ATM) transmission system, adapted for the transmission of IP data packets, using ATM as a carrier network.

8. In a transmission system, adapted for the transmission of IP data packets, said system including an IP-Network (IP-NET) and a network (LAN) protected by a firewall, a method for the transmission of IP data packets to the protected network, said firewall being opened for a limited period of time and IP data packets are transmitted through the opened firewall to the protected network (LAN) **characterised by** a first IC-breaker (IC-BREAKER 1) being located on the outside of the firewall and a second IC-breaker (IC-BREAKER 2) being located on the inside of the firewall, and by

- IP data packets being received and stored by said first IC-breaker;
- on receipt of said IP data packets a particular type of IP-packets are transmitted by said first IC-Breaker to said second IC-breaker through the firewall;
- awaiting receipt of said particular type of IP-packet from said second IC-breaker, said IP-packet opening the firewall for a short period of time; and

- sending said stored IP data packet through the open firewall to said second IC-breaker.

9. A method, as claimed in claim 8, **characterised by** said particular type of IP-packet being a Ping (ICMP)-packet.

10. A method, as claimed in claim 9, **characterised by:**

- the size of a Ping IP-packet received from said first IC-breaker (IC-Breaker 1), being identified by said second IC-breaker (IC-Breaker 2), said size being indicative of the type of packets which have been received and the port via which it was received;
- ping IP-packet being returned to said first IC-breaker (IC-Breaker 1) by said second IC-breaker (IC-Breaker 2), thereby opening the firewall for a limited period of time;
- said second IC-breaker (IC-Breaker 2) awaiting receipt, from said first IC-breaker, of said IP data packet for the protected network, during said limited period of time said firewall is open; and
- said second IC-breaker (IC-Breaker 2) sending the received IP data packet to the protected network.

11. A method, as claimed in any of claims 8 to 10, **characterised in** that said protected network is a Local Area Network (LAN).

12. A method, as claimed in any of claims 8 to 11, **characterised in** that said system is an Asynchronous Transfer Mode (ATM) transmission system, adapted for the transmission of IP data packets, using ATM as a carrier network.

13. Apparatus for providing access to a firewall protected network, including means for temporarily opening the firewall to enable IP data packets to be transmitted through the firewall to said protected network (LAN) **characterised in** that said means for temporarily opening the firewall include two IC-breakers, (IC-breaker 1 and IC-breaker 2) located on opposite sides of said firewall, and in that said firewall is adapted to allow IP-traffic from one side thereof the other side and

04-10-2000

communication between said IC-breakers using a Ping service, a response to said Ping service temporarily opening the firewall for the transmission of IP data packets to said protected network (LAN).

14. Apparatus as claimed in claim 13, **characterised in** that the IC-breaker, located on the outside of said firewall, is adapted to:

- store IP data packets destined for the protected network (LAN);
- send Ping IP-packets to the other IC-breaker through the firewall;
- await receipt of a returned Ping IP-packet from said other IC-breaker, said returned IP-packet opening the firewall for a limited period of time; and
- send said stored IP data packets through the open firewall to said other IC-breaker.

15. Apparatus, as claimed in either claim 13, or claim 14, **characterised in** that the IC-breaker (IC-BREAKER 2), located on the protected network side of the firewall is adapted to:

- identify the size of a Ping IP-packet, received from a sender in the form of a IC-breaker, located outside the firewall, said size being indicative of the type of packet which has been received and the port via which it was received;
- return the Ping IP-packet to the sender, which opens the firewall for a limited period of time;
- await receipt, from the sender, of said IP data packet for the protected network during said limited period of time said firewall is open; and
- send the received IP data packets to the protected network.

16. Apparatus, as claimed in claim 13, **characterised in** that the first one of said IC-breakers (IC-BREAKER 1) is located on the outside of the firewall and that the second one of said IC-breakers (IC-BREAKER 2) is located on the protected network side (LAN) of the firewall, in that said first IC-breaker is adapted to receive and store IP data packets destined for the protected network, in that said IC-breakers are adapted, on receipt, by said first IC-breaker, of a IP data packet for the protected network, to communicate with each other, through

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the firewall, using Ping (ICMP)-packets, a Ping-packet returned by said second IC-breaker to said first IC-breaker temporarily opening the firewall for this type of traffic, in that said first IC-breaker (IC-BREAKER 1) is adapted, on receipt of the returned Ping-packet, to send IP data packets through the opened firewall to the second IC-breaker (IC-BREAKER 2), and in that said second IC-breaker is adapted, on receipt of said IP data packet, to send the received packets to the protected network.

17. An IC-breaker adapted for use with apparatus as claimed in any of claims 13 to 16, **characterised in** that said IC-breaker includes means for transmitting PING packets to an IC-breaker, located behind a firewall, means for storing a received IP packets, means for detecting receipt of said IP packets from within said firewall, and means, operative in response to receipt of IP packets to transmit stored IP packets.

18. An IC-breaker adapted for use with apparatus as claimed in any of claims 13 to 16, **characterised in** that said IC-breaker includes means for identifying a received PING packet and determining an associated IP packet type therefrom, means for transmitting an IP packets of said associated IP packet type through the firewall, means for receiving an IP packet transmitted through said firewall, and means for distributing said IP packet to a predetermined address.

19. A transmission system, adapted for the transmission of IP data packets, said system including an IP-network (LAN) protected by a firewall, **characterised in** that said system includes an apparatus as claimed in any of claims 13 to 16.

20. A communications system including a transmission system as claimed in any of claims 1 to 7 or claim 19, or operating in accordance with a method as claimed in any of claims 8 to 12.

(PCT Rule 61.2)

**in its capacity as elected Office**

**Best Available Copy**



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

IN RE APPLICATION OF: Martin HAMMARSTROM, et al.

SERIAL NUMBER: NEW U.S. PCT APPLICATION (based on PCT/SE99/01561)

FILED: HEREWITH

FOR: IMPROVEMENTS IN, OR RELATING TO, TRANSMISSION SYSTEMS

**REQUEST FOR CONSIDERATION OF DOCUMENTS**  
**CITED IN INTERNATIONAL SEARCH REPORT**

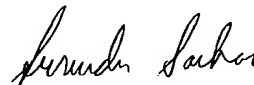
Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

In the matter of the above-identified application for patent, notice is hereby given that applicant(s) request that the Examiner consider the documents cited in the International Search Report according to MPEP §609 and so indicate by a statement in the first Office Action that the information has been considered. When the Form PCT/DO/EO/903 indicates both the search report and copies of the documents are present in the national stage file, there is no requirement for the applicant(s) to submit them (1156 O.G. 91 November 23, 1993).

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



Marvin J. Spivak  
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Registration No. 24,913  
Surinder Sachar  
Attorney of Record  
Registration No. 34,423



**22850**

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Fax No. (703) 413-2220  
(OSMMN 1/97)

# PATENT COOPERATION TREATY

WO 00/16530  
PCT/SE99/01561

PCT

From the INTERNATIONAL BUREAU

## NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To:

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Date of mailing (day/month/year) 23 March 2000 (23.03.00)		IMPORTANT NOTICE	
Applicant's or agent's file reference Case 704 PCT			
International application No. PCT/SE99/01561	International filing date (day/month/year) 08 September 1999 (08.09.99)	Priority date (day/month/year) 11 September 1998 (11.09.98)	
Applicant TELIA AB (publ) et al			

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:  
US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:  
EE,EP,LT,LV,NO

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on 23 March 2000 (23.03.00) under No. WO 00/16530

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If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

### REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

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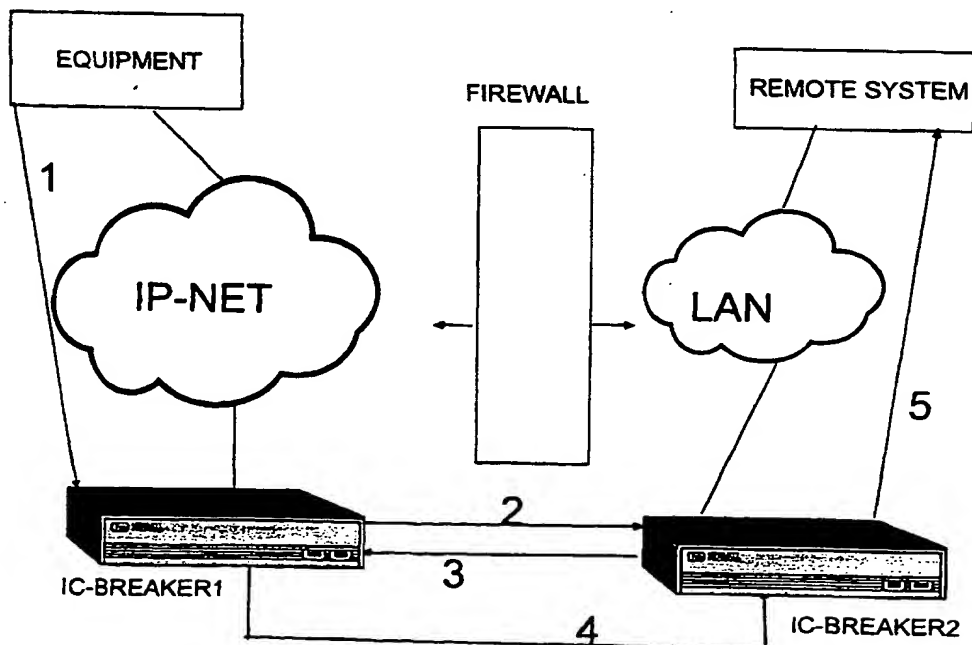
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(74) Agent: PRAGSTEN, Rolf; Telia Research AB, Vitsandsgatan 9, S-123 86 Farsta (SE).			

(54) Title: A TRANSMISSION SYSTEM, A METHOD AND AN APPARATUS PROVIDING ACCESS FOR IP DATA PACKETS TO A FIREWALL PROTECTED NETWORK

## (57) Abstract

The invention provides a transmission system, for example, an ATM transmission system, which is adapted for the transmission of IP data packets, and which includes an IP-network, a network protected by a firewall, and means for temporarily opening the firewall to enable IP data packets to be transmitted through the firewall to the protected network. The firewall operates in a manner whereby a particular type of IP-packet, i.e. a Ping (ICMP)-packet, is allowed to pass through the firewall, IP-traffic can pass through the firewall from the inside thereof to the outside thereof, and IP-traffic, similar to that which is sent from the inside of the firewall to the outside of the firewall, can be transmitted through the firewall to the protected network for a limited period of time. In particular, the firewall opening means include two IC-breakers, which are located on opposite sides of said firewall, and which have a structure and functionality dictated by the manner in which the firewall operates. In other words, when an IP data packet, destined for the protected networks, is received by the IC-breaker located on the outside of the firewall, the IC-breakers are adapted to communicate with each other to create the temporary opening in the firewall via which the IP data packet is sent to the protected network.



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INTERNATIONAL SEARCH REPORT

International application No.  
PCT/SE 99/01561

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04L 29/06  
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	EP 0909075 A1 (LUCENT TECHNOLOGIES INC.), 14 April 1999 (14.04.99), page 3, line 10 - page 4, line 14; page 6, line 20 - page 7, line 28, claims 1-13, abstract --	1-4,7-14, 18-20,27,28
X	EP 0743777 A2 (SUN MICROSYSTEMS, INC), 20 November 1996 (20.11.96), abstract, column 3, line 33 column 4, line 9, column 6, line 46 - column 13, line 6, column 9, line 23 - line 31, column 10, line 50 - column 11, line 43 --	1-4,7-14, 18-20,27,28
X	WO 9831124 A1 (HANSON, GORDON ET AL), 16 July 1998 (16.07.98), page 3, line 8 - page 6, line 32, figure 2, claims 1-20, abstract --	1-4,7-14, 18-20,27,28

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 14 March 2000	Date of mailing of the international search report 17-03-2000
Name and mailing address of the ISA Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Johanna Lindqvist/CF Telephone No. +46 8 782 25 00

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01561

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 5826029 A (GORE, JR. ET AL), 20 October 1998 (20.10.98), column 1, line 47 - column 2, line 26, claims 1-12, abstract  --	1-28
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A	EP 0713311 A1 (MILKYWAY NETWORKS CORPORATION), 22 May 1996 (22.05.96), page 3, line 48 - page 5, line 31, claims 1-28, abstract  -- -----	1-28

INTERNATIONAL SEARCH REPORT  
Information on patent family members

02/12/99

International application No.  
PCT/SE 99/01561

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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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 (71) Applicant (for all designated States except US): TELIA AB  
 (publ) [SE/SE]; Mårbackagatan 11, S-123 86 Farsta (SE).  
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 tin [SE/SE]; Mellangatan 33 A, S-554 51 Jönköping (SE).  
 SPARR, Thomas [SE/SE]; Köpmansgatan 14 A, S-571 32  
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 (74) Agent: PRAGSTEN, Rolf; Telia Research AB, Vitsandsgatan  
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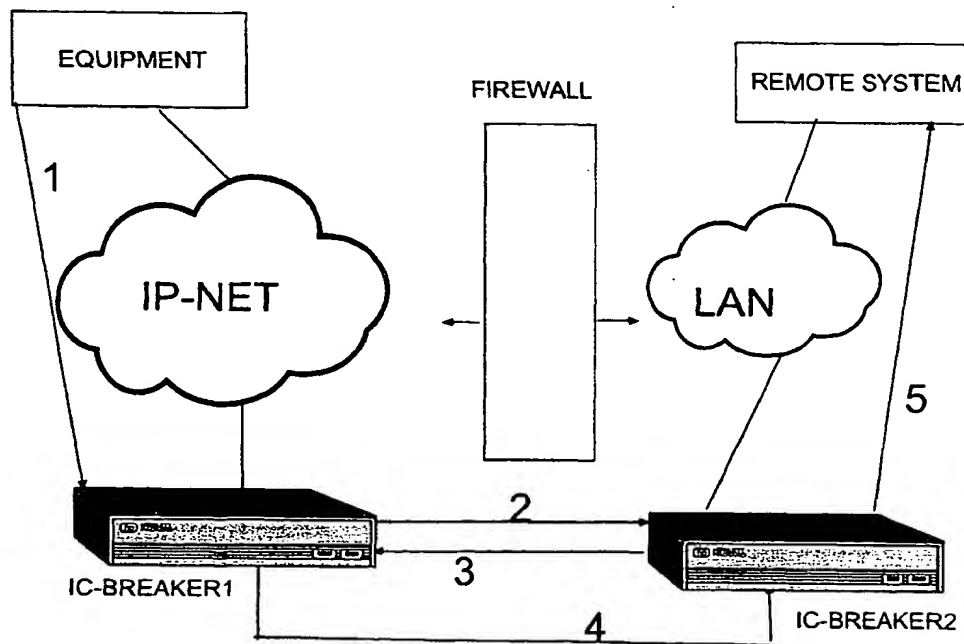
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(54) Title: TRANSMISSION SYSTEM ADAPTED FOR IP DATA PACKETS

## (57) Abstract

The invention provides a transmission system, for example, an ATM transmission system, which is adapted for the transmission of IP data packets, and which includes an IP-network, a network protected by a firewall, and means for temporarily opening the firewall to enable IP data packets to be transmitted through the firewall to the protected network. The firewall operates in a manner whereby a particular type of IP-packet, i.e. a Ping (ICMP)-packet, is allowed to pass through the firewall, IP-traffic can pass through the firewall from the inside thereof to the outside thereof, and IP-traffic, similar to that

which is sent from the inside of the firewall to the outside of the firewall, can be transmitted through the firewall to the protected network for a limited period of time. In particular, the firewall opening means include two IC-breakers, which are located on opposite sides of said firewall, and which have a structure and functionality dictated by the manner in which the firewall operates. In other words, when an IP data packet, destined for the protected networks, is received by the IC-breaker located on the outside of the firewall, the IC-breakers are adapted to communicate with each other to create the temporary opening in the firewall via which the IP data packet is sent to the protected network.





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**CLAIMS**

1. A transmission system, adapted for the transmission of IP data packets, said system including an IP-network and a network protected by a firewall, said firewall  
5 being adapted to block incoming traffic to the protected network, characterised in that said system further includes means for temporarily opening the firewall to enable IP data packets to be transmitted through the firewall to the protected network.

10 2. A transmission system, as claimed in claim 1, characterised in that said firewall is adapted to be transparent to:

- Ping (ICMP)-packets;
- 15 - IP-traffic passing through the firewall from the inside thereof to the outside thereof; and
- for a limited period of time, IP-traffic, similar to that which is sent from the inside of the firewall to the outside of the firewall, passing through the firewall  
20 from the outside thereof to the inside thereof.

3. A transmission system, as claimed claim 2, characterised in that said means for temporarily opening the firewall include first and second IC-breakers, located on opposite sides of said firewall, and in that said IC-breakers have a structure and  
25 functionality dictated by the manner in which said firewall is adapted to operate.

4. A transmission system, as claimed in claim 3, characterised in that said first IC-breaker is adapted, on receipt of an IP data packet, to:

- 30 - store said IP data packet;

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- send a Ping IP-packet to the second IC-breaker through the firewall;
- await receipt of a returned Ping IP-packet from the second IC-breaker, said IP- packet opening the firewall for a short period of time; and
- send said stored IP data packet through the open firewall to the second IC-breaker.

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10 5. A transmission system, as claimed in either claim 3, or claim 4, characterised in that said second IC-breaker is adapted to:

- identify the size of a Ping IP-packet received from a sender located outside of the firewall, said size being indicative of the type of packet which has been received and the port via which it was received;
- return the Ping IP-packet to the sender, which opens the firewall for a limited period of time;
- await receipt, from the sender, of an IP data packet for the protected network, during said limited period of time said firewall is open; and
- send the received IP data packet to the protected network.

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25 6. A transmission system, as claimed in claim 3, characterised in that said first IC-breaker is located on the IP-network side of the firewall and said second IC-breaker is located on the protected network side of the firewall, in that said first IC-breaker is adapted to receive IP data packets from IP-network equipments that are destined for the protected network, in that said IC-breakers are adapted, on receipt, by said first IC-breaker, of a IP data packet for the protected network, to communicate with each other, through the firewall, using Ping (ICMP)-packets. a  
30 Ping-packet returned by said second IC-breaker to said first IC-breaker temporarily

opening the firewall for this type of traffic, in that said first IC-breaker is adapted, on receipt of the returned Ping-packet, to send the IP data packet through the opened firewall to the second IC-breaker, and in that said second IC-breaker is adapted, on receipt of said IP data packet, to send the received packet to the protected network.

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7. A transmission system, adapted for the transmission of IP data packets, said system including an IP-network and a network protected by a firewall, characterised in that said firewall is adapted to allow:

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– a particular type IP-packet to pass through the firewall to the protected network,

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– IP-traffic to pass through the firewall from the inside thereof to the outside thereof, said IP-traffic opening the firewall for IP-traffic for a limited period of time; and

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– IP-traffic, similar to that which is sent from the inside of the firewall to the outside of the firewall, to be transmitted through the firewall to the protected network during said limited period of time.

8. A transmission system, as claimed in claim 7, characterised in that said particular type of IP-packet is a Ping (ICMP)-packet.

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9. A transmission system, as claimed in any preceding claim, characterised in that said protected network is a Local Area Network (LAN).

10. A transmission system, as claimed in any preceding claim, characterised in that said system is an Asynchronous Transfer Mode (ATM) transmission system, adapted for the transmission of IP data packets, using ATM as a carrier network.

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11. In a transmission system, adapted for the transmission of IP data packets,

said system including an IP-Network and a network protected by a firewall, a method for the transmission of IP data packets to the protected network, characterised by opening said firewall for a limited period of time and by transmitting an IP data packet, through the opened firewall, to the protected network.

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12. A method, as claimed in claim 11, characterised by said firewall allowing:

– a particular type of IP-packet to pass through; and

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– IP-traffic to pass through, from the inside thereof to the outside thereof, said IP-traffic opening the firewall for said limited period of time;

and by transmitting said IP data packet to said protected network during said limited period of time, said IP data packet being similar to the IP-traffic which opens the firewall for said limited period of time.

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13. A method, as claimed in claim 12, characterised by said particular type of IP-packet being a Ping (ICMP)-packet.

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14. A method, as claimed in either claim 12, or claim 13, characterised by said system including first and second IC-breakers, located on opposite sides of said firewall, and by said IC-breakers having a structure and functionality dictated by the manner in which said firewall operates.

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15. A method, as claimed in claim 14, characterised by said first IC-breaker being located on the outside of the firewall and said second IC-breaker being located on the inside of the firewall, and by said first IC-breaker:

– receiving and storing IP data packets for the protected network;

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– on receipt of said IP data packet, sending Ping IP-packets to the second IC-

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breaker through the firewall;

- awaiting receipt of a return Ping IP-packet from the second IC-breaker, said IP-packet opening the firewall for a short period of time; and
- sending said stored IP data packet through the open firewall to the second IC-breaker.

16. A method, as claimed in claim 15, characterised by said second IC-breaker:

- identifying the size of a Ping IP-packet received from said first IC-breaker, said size being indicative of the type of packet which has been received and the port via which it was received;
- returning the Ping IP-packet to said first IC-breaker, thereby opening the firewall for a limited period of time;
- awaiting receipt, from said first IC-breaker, of said IP data packet for the protected network, during said limited period of time said firewall is open; and
- sending the received IP data packet to the protected network.

17. A method, as claimed in claim 14, characterised by:

- said first IC-breaker being located on the IP-network side of the firewall and said second IC-breaker being located on the protected network side of the firewall;
- said first IC-breaker receiving and storing IP data packets from IP-network equipments that are destined for the protected network;

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- said IC-breakers, on receipt, by said first IC-breaker, of a IP data packet for the protected network, communicating with each other, through the firewall, using Ping (ICMP)-packets, a Ping-packet returned by said second IC-breaker to said first IC-breaker temporarily opening the firewall for this type of traffic;
- said first IC-breaker, on receipt of the returned Ping-packet, sending the IP data packet through the opened firewall to the second IC-breaker; and
- said second IC-breaker, on receipt of said IP data packet, sending the received packet to the protected network.

18. A method, as claimed in any of claims 11 to 17, characterised in that said protected network is a Local Area Network (LAN).

19. A method, as claimed in any of claims 11 to 18, characterised in that said system is an Asynchronous Transfer Mode (ATM) transmission system, adapted for the transmission of IP data packets, using ATM as a carrier network.

20. Apparatus for providing access to a firewall protected network, characterised in that said arrangement includes means for temporarily opening the firewall to enable IP data packets to be transmitted through the firewall to said protected network.

21. Apparatus, as claimed in claim 20, characterised in that said means for temporarily opening the firewall include two IC-breakers, located on opposite sides of said firewall, and in that said firewall is adapted to allow IP-traffic to be transmitted from the inside thereof to the outside thereof, and communication between said IC-breakers using a Ping service, a response to said Ping service temporarily opening the firewall for the transmission of IP data packets to said protected network.

22. Apparatus as claimed in claim 21, characterised in that said IC-breaker, located on the outside of said firewall, is adapted to:

- store IP data packets destined for the protected network;
- send Ping IP-packets to the other IC-breaker through the firewall;
- await receipt of a returned Ping IP-packet from said other IC-breaker, said IP-packet opening the firewall for a limited period of time; and
- send said stored IP data packet through the open firewall to said other IC-breaker.

23. Apparatus, as claimed in either claim 21, or claim 22, characterised in that said IC-breaker, located on the protected network side of the firewall is adapted to:

- identify the size of a Ping IP-packet received from a sender located outside the firewall, said size being indicative of the type of packet which has been received and the port via which it was received;
- return the Ping IP-packet to the sender, which opens the firewall for a limited period of time;
- await receipt, from the sender, of an IP data packet for the protected network, during said limited period of time said firewall is open; and
- send the received IP data packet to the protected network.

24. Apparatus, as claimed in claim 21, characterised in that a first one of said IC-breakers is located on the outside of the firewall and a second one of said IC-breaker is located on the protected network side of the firewall, in that said first IC-



breaker is adapted to receive and store IP data packets destined for the protected network, in that said IC-breakers are adapted, on receipt, by said first IC-breaker, of a IP data packet for the protected network, to communicate with each other, through the firewall, using Ping (ICMP)-packets, a Ping-packet returned by said  
5 second IC-breaker to said first IC-breaker temporarily opening the firewall for this type of traffic, in that said first IC-breaker is adapted, on receipt of the returned Ping-packet, to send the IP data packet through the opened firewall to the second IC-breaker, and in that said second IC-breaker is adapted, on receipt of said IP data packet, to send the received packet to the protected network.

10 25. An IC-breaker adapted for use with apparatus as claimed in any of claims 20 to 24, characterised in that said IC breaker includes means for transmitting PING packets to an IC breaker located behind a firewall, means for storing a received IP packet, means for detecting receipt of an IP packet from within said firewall, and  
15 means, operative in response to receipt of an IP packet from within said firewall, to transmit IP stored packets.

20 26. An IC-breaker adapted for use with apparatus as claimed in any of claims 20 to 24, characterised in that said IC-breaker includes means for identifying a received PING packet and determining an associated IP packet type therefrom, means for transmitting an IP packet of the type associated with the received IP packet through the firewall, means for receiving an IP packet transmitted through said firewall, and means for distributing said IP packet to a predetermined address.

25 27. A transmission system, adapted for the transmission of IP data packets, said system including an IP-network and a network protected by a firewall, characterised in that said system includes apparatus as claimed in any of claims 20 to 24.

30 28. A communications system including a transmission system as claimed in any of claims 1 to 10 or claim 27, or operating in accordance with a method as claimed in any of claims 11 to 19.